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This application claims benefit of U.S. provisional patent application Serial No. 60/126,834 filed March 30, 1999, which is hereby incorporated by reference in its entirety.

The invention relates to communication systems in general and, more specifically, the invention relates to an interactive information distribution system in which a secondary content stream associated with a primary content stream may be selected for presentation by a user.

BACKGROUND OF THE INVENTION

In several communication systems, the data to be transmitted is compressed so that the available bandwidth is used more efficiently. For example, the Moving Pictures Experts Group (MPEG) has promulgated several standards related to digital data delivery systems. The first, known as MPEG-1, refers to the ISO/IEC Standards 11172 and is incorporated herein by reference in its entirety. The second, known as MPEG-2, refers to the ISO/IEC standards 13818 and is incorporated herein by reference in its entirety. A compressed digital video system is described in the Advanced Television Systems Committee (ATSC) digital television standards document A/53, which is incorporated herein by reference in its entirety. The European standards known as the Digital Video Broadcasters (DVB) Standards provide functionality similar to that provided by the ATSC Systems. The DVB standards are incorporated herein by reference in their entirety.

Several interactive digital video on demand (VOD) services are known. For example a service known as the DIVA System is manufactured by DIVA Systems Corporation of Redwood City, California. The DIVA System distributes audio-visual information to individual subscribers utilizing MPEG-like information streams. Subscribers within the DIVA System utilize

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The invention comprises a method and apparatus for inserting advertisement and/or other information into an audio-video presentation during the presentation of non-active imagery. More specifically, in a case of a user interrupting the standard presentation of a content stream via, for example, pressing a pause or stop button on a remote control device, the size of an image region presently displaying the interrupted content stream is

reduced, and advertisement and/or other information is inserted into at least portions of the image region formerly occupied by the interrupted content imagery or overlayed onto the interrupted content imagery.

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BRIEF DESCRIPTION OF THE DRAWINGS

The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 depicts a high-level block diagram of an interactive information
10 distribution system;

FIG. 2 depicts an interaction diagram useful in understanding the present invention;

FIG. 3 depicts a logical diagram indicative of data flow within the information distribution system of FIG. 1;

15 FIG. 4 depicts an exemplary display screen as modified according to the invention;

FIG. 5 depicts a flow diagram of a subscriber side method according to the invention; and

20 FIG. 6 depicts a flow diagram of a provider side method according to the invention.

DESCRIPTION OF THE EMBODIMENT

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The invention will primarily be described in the context of the interactive video-on-demand (VOD) system known as the DIVA System.

However, it will be appreciated by those skilled in the art that the teachings of the present invention may be readily applied to other interactive information distribution systems. Specifically, the teachings of the present invention are
30 applicable to any interactive information distribution system in which a user may interrupt the presentation of a content stream such that advertisement

information may be provided in place of the content stream during the interruption period.

The invention will be described within the context of an interactive information distribution system including information provider or server equipment and information consumer or user equipment. The information provider equipment provides content streams to the information consumer equipment in response to requests for the content streams. Information consumers may utilize a user input device such as a remote control device to effect a stop or pause command, to which the information provider equipment responsively halts the serving of the requested content stream. Upon halting the requested content stream, the information server equipment provides advertisement content in place of, or along with, still or moving imagery associated with the halted content stream.

The invention will also be described as providing advertisement content, advertising streams, secondary content and/or secondary streams. For purposes of the disclosure, all of these terms are intended to denote a secondary or non-primary content stream. A primary content stream comprises a content stream requested by a subscriber. The secondary content stream may comprise advertising, instructional videos, help screens (e.g., context sensitive help and the like), information pertaining to actors, locations, items, goods and/or services depicted in a scene within the primary content and similar information. The secondary content may comprise still or moving imagery, audio or non-audio information, text files, graphics files or any combination thereof. Broadly speaking, secondary content simply comprises an information bearing file.

FIG. 1 depicts a high-level block diagram of an interactive information distribution system including the invention. Specifically, a cable system head end 120 interacts with a plurality of subscriber equipment 140₁ through 140_n via a forward channel FC and a back channel BC. The forward channel FC and back channel BC are implemented using a distribution network 130. The cable system head end receives subscriber requests for audio-visual programs by the back channel BC and responsively provides the requested audio-visual

5 FORWARD, REWIND, FAST PLAY and the like.

In response to a received STOP or PAUSE command, the cable system head end terminates the streaming of the respective requested content stream to the subscriber equipment. The subscriber equipment may implement a "freeze-frame" function such that a presentation device associated with the subscriber equipment displays still imagery associated with the last video frame received. In response to a FAST FORWARD or REWIND command, the cable system head end is selected and FAST FORWARD or REWIND content stream associated with the normal play content stream provided to the subscriber. The selected FAST FORWARD or REWIND content stream is then provided to the requesting subscriber in place of the normal play content stream, thereby implementing the FAST FORWARD or REWIND function. Alternatively, only portions of the normal play content stream (such as I-frames) are provided to the subscriber in either a forward temporal order (FF) or a reverse temporal order (REW). Any method of implementing a FF/REW function may be used within the present invention. It should be noted that any method of implementing a fast forward or rewind function may be used within the context of the present invention. The above FF/REW methods are provided for illustrative purposes only.

The subscriber equipment 140 comprises a set-top box (STB) 142, a presentation device 144 and a user input device such as a remote control device 146. The set-top box 142 receives content streams and control information from the cable system head end 120 via the forward channel FC. The set-top box transmits user commands and other control information to the cable system head end 120 via the back channel BC. The set-top box 142 receives user commands and other user interaction via the user input device 146. The set-top box 142 provides audio and video streams suitable for use by the

The cable system head end 120 comprises a video server 122, a head end controller 124, a transport processor 126 and an advertisement manager 128.

The video server 122 comprises mass storage devices and other devices suitable for storing content streams. Content streams comprise, illustratively, compressed video streams and associated audio streams representing movies,

The advertisement manager 128 is depicted as a distinct functional

The advertisement manager 128 comprises three primary functions; namely, a web portal function, a movie description file data base function and an advertisement data base function. The web portal function comprises the functionality necessary to retrieve, from the internet or other network, advertisement content streams, web pages, streaming media or other information available from the internet or other computer network. The retrieved advertisement information is provided directly to users, provided to the video server 122 or stored by the advertisement manager 128 for future use.

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identified separately in the advertisement data stream. As previously discussed with respect to the movie descriptor file data base function and the advertisement data base function of the advertisement manager 128, the advertisements provided to a user are organized, for example, in a manner reflecting the use of the advertised goods and/or services within a scene or temporal portion of a content stream such as a movie. It will also be appreciated that each user within the interactive information distribution system 100 of FIG. 1 may be associated with demographic data that may be used to define appropriate advertisement content to be provided to the user.

Thus, in one embodiment of the invention, rather than providing advertisement content to a user based upon the stop or pause location within a content stream, the provided advertisement content comprises demographically appropriate advertisement content, regardless of the relationship to the advertised goods and/or services to a content stream being viewed by the user.

In still another embodiment of the invention, both demographic information and content-related information are used to determine the secondary content provided to the subscriber in response to a stop or pause command. Specifically, as previously discussed, a primary content stream is divided into a plurality of temporal segments or scenes, where each temporal segment or scene has associated with it a respective group of advertisement content or other secondary content. Additionally, the subscriber has associated with him or her a demographic profile indicative of, for example, household income, address, education level, buying preferences, responses given to previous inquiries regarding demographic information and other information relevant to a determination by an advertiser that a particular subscriber would or would not be a likely candidate for the goods and/or services of the advertiser. In this embodiment of the invention, the goods and/or services (or other secondary content) associated with the scene or temporal segment in which the subscriber invoked the stop or pause command are determined. Those goods and/or services or other secondary content that are also appropriate with respect to the demographic profile of the subscriber are used to determine which advertisement content or other secondary content will be

provided to the subscriber. Thus, in this embodiment of the invention, the secondary content provided to the subscriber comprises demographically appropriate secondary content selected from the group of secondary content associated with the scene or temporal segment stopped or paused by the subscriber.

The use of advertisement data streams will be discussed in more detail with respect to FIGS. 2 through 4. Briefly, a user receiving a content stream, including associated advertisement data streams, may stop or pause and receive content stream. The set-top box 142, upon receiving the STOP or PAUSE command, causes the present frame to be "frozen" and decimated such that the frozen frame occupies only a portion of the display area of the presentation device. The set-top box 142 then extracts advertisement information associated with the presently displayed scene. The advertisement information presented on the display screen and a user operating the user input device 146 may select particular advertisements for subsequent presentation. In the case of a user selecting a particular advertisement for a presentation, a selection command is promulgated via the back channel to the cable system head end 120. The cable system head end 120 responsively retrieves the selected advertisement stream, web page or other information and provides that information to the requesting subscriber equipment via the forward channel FC for presentation to the requesting user.

The advertisement information may be included within the content stream, provided as a contemporaneous auxiliary stream, or provided by the server in response to the stop/pause command. The server may use the present scene context or the demographic data associated with the user to determine a specific advertisement information to provide.

The video server 122 couples content streams, advertisement streams and other streams to the transport processor 126. The transport processor 126 implements all the interface requirements associated with the distribution network 130. Specifically, the transport processor 126 accomplishes all the forward content channel transmission interface requirements of the system of FIG. 1. The transport processor 126 is coupled to the subscriber network 140

via the forward channel FC and back channel BC. The forward channel FC is supported by the distribution network 130 and comprises a relatively high bandwidth communications channel well-suited to carrying video, audio and data such as, for example, multiplexed MPEG-2 transport packets. The forward channel may also comprise a high bandwidth channel for video data and a relatively low bandwidth channel for control data. In the system 100 of FIG. 1, the forward channel is used to provide both content and control information to the subscriber equipment 140. The back channel BC may comprise a lower bandwidth communication channel that is also supported by the distribution network 130.

The distribution network 130 can be any one of a number of conventional broadband communication networks that are available such as a fiber optic network, a telephone network, and existing cable television network and the like. For example, if the network is a hybrid fiber-coax network, the transmission transport technique used in both forward channels may be modeled after the Moving Pictures Expert Group (MPEG) transport protocol for the transmission of video data streams.

In response to a user request for a particular content file, the head end controller 124 causes the requested content file to be streamed to the transport processor 126 from the video server 122. Additionally, the head end controller 124 causes advertisement data associated with the requested content file to be streamed to the transport processor 126 from the video server 122 or the advertisement manager 128. The advertisement data comprises selectable objects that are displayed to a user upon the user interrupting the presentation of the content stream (e.g., pausing or stopping the presentation). The advertisement data may be carried as a separate data stream with its own program stream or within a transport stream including the content stream (i.e., a data stream having a unique packet identifier or PID).

FIG. 2 depicts an interaction diagram useful in understanding the present invention. Specifically, FIG. 2 depicts an interaction diagram depicting interactions between various entities forming a system that utilizes the present

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At step 0, the user causes a “pause” command to be sent to the set top box 260 by, for example, pressing a “pause” key on a remote control device (not

or downloaded ad is provided by the transport processor 240 to the set top box 260 via the communications network. At step 19, the set top box 260 causes the downloaded ad to be displayed on the presentation device 250.

FIG. 3 depicts a content data flow diagram used for understanding the present invention. Specifically, FIG. 3 depicts content data flow between the various elements of the head end 120 and subscriber equipment 140 previously described with respect to FIG. 1. It is noted that the contents may comprise advertisement content or non-advertisement content. Moreover, it is noted that there is no depiction within FIG. 3 of the back channel (BC) of the interactive information distribution system, though such back channel is present.

Referring now to FIG. 3, MPEG movies and advertisements, movie descriptor files (MDF) and advertised display information is coupled to the content introduction module 110 as indicated by data flow path 310.

MPEG content and advertisement comprise respective MPEG-compliant streams including compressed content streams (such as movies, television programs, sporting events and the like) or advertisement streams. A movie descriptor file (MDF) comprises a data file indicative of the goods and/or services used in each scene of the movie that are associated with advertisement streams, web links or other information that may be selected by a user.

All of the content that is stored within the video server 122 is first processed by the content introduction module 110. Thus, the content introduction module processes content such as movies, television shows and the like, advertisement imagery, movie description information and advertisement display information. All of the MPEG streams, such as video and audio streams associated with content or advertisement, are sent to the video server 122 for storage. The movie descriptor files and advertisement display information are coupled from the content introduction module 110 to the advertisement manager 128. The advertisement manager 128 includes a movie descriptor file database and an advertisement display information database. The advertisement manager 128 also receives web content from the internet via data path 350.

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the subscriber. In response to a pause or stop command 415, the set-top box changes the displayed screen from the screen of 410 to the screen of 420. The second display screen 420 comprises a content portion 420(c), a general advertisement portion 420(a) and a scene-based advertisement portion 420(b).

- 5 The content portion 420(c) comprises a still image or frozen frame that has been decimated to be reduced in size. The general advertisement link portion of the display screen includes a plurality of links AD_1 through AD_n (collectively links AD). Each of these advertisement links comprises a graphical object representing a link to a web page, a link to advertisement content stored on the
- 10 video server 122, or a link to other information. Similarly, the scene-based link region 420(b) includes a plurality of objects providing links to goods and/or services that are associated with the presently-displayed scene of the requested content. That is, a movie or other audio-visual program is divided into a plurality of scenes, each of these scenes comprising a plurality of frames. The
- 15 frozen frame displayed within the content region 420(c) is, therefore, associated with a particular scene. Within that scene, a plurality of goods and/or services are used, represented, placed or otherwise associated with the scene. These goods and/or services may comprise products being used by the actors, clothing worn by the actors, automobiles, vacation spots or locations that the scene is
- 20 filmed in and other information. The scene-based links 420(b) comprise graphical objects that may be selected by the user to provide more information about at least those goods and/or services which have been associated with the scene as an auxiliary stream or by a movie description/advertisement display information file. As previously discussed, the advertisement provided to a
- 25 subscriber may be based upon demographic data associated with the subscriber or the advertisement information associated with the scene within which the subscriber has stopped or paused the presentation of the requested content.

All of the general advertisement links AD_1 through AD_n and the scene-based advertisement links comprise graphical objects and may be selected by a

30 user manipulating a remote control device associated with the set-top box causing the second display 420 to be displayed on a presentation device. Upon selecting an object or link 425, the set-top box causes the presentation device to

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the displayed imagery, whether still or moving imagery. Alternatively, the "hot spots" may comprise web links or other advertisement related links displayed within or proximate to the still or moving imagery. In one embodiment of the invention, the still or moving imagery and any web links, whether content-

5 related web links or general web links are included within a video stream provided to the information consumer. Thus, in this embodiment, the imagery described above with respect to FIG. 4 is primarily provided within a so-called video layer. A graphical layer may be used to selectively provide emphasis or de-emphasis of hot spots in response to user manipulations tending to indicate

10 particular hot spots. An example of combined video layer and graphical layer information being used in this manner, along with control layer information, is described in more detail in U.S. Patent Application Serial No. 08/984,427, filed on December 3, 1997, entitled METHOD AND APPARATUS FOR PROVIDING A MENU STRUCTURE FOR AN INTERACTIVE INFORMATION

15 DISTRIBUTION SYSTEM . This U.S. Patent Application discloses a means for providing a navigator function within an interactive information distribution system such as the DIVA System, and is incorporated herein by reference in its entirety. Specifically, this patent discloses methods and apparatus for combining a video layer, graphical layer, and control layer together as an

20 applet and providing the applet to a subscriber in response to a subscriber interaction requesting the applet. Within the context of the present invention, the teachings of U.S. Patent Application Serial No. 08/984,427 are applicable to the delivery of secondary content and/or the selection of such secondary content from a primary content stream. That is, given a primary content stream, or a

25 secondary content stream, user interaction is interpreted by a control layer and associated with objects within a graphical layer such that video layer objects are responsively emphasized and/or de-emphasized within the video layer. In this manner, the subscriber may interactively select defined graphical/video objects within the received imagery, such as web links, hot spots indicative of

30 goods and/or services within the primary content stream and other items. Other applications for these methods and apparatus to the present invention will be readily appreciated by those skilled in the art.

5 The method 500 of FIG. 5 is entered at step 502, where the selected content stream is presented until interrupted by the user. While such an interruption may comprise any of the VCR-like functions previously described, for purposes of this illustration, it will be assumed that the user interruption comprises one of a STOP command or a PAUSE command.

At step 508, advertisement information is integrated into the image presented via the display device. That is, advertisement information is integrated using one or more of the techniques depicted in box 510; namely, a mosaic display, a picture-in-picture (PIP) display, and overlay display or other display technique. A mosaic display comprises the display of a plurality of distinct image regions, each of the image regions including respective imagery. Thus, a mosaic display may show a first image region in which the frozen imagery from step 506 is displayed, while one or more other image regions may comprise advertisement or other information, such as previously described with respect to FIG. 4. It will be noted that in the case of a non-overlay display technique, the frozen image will typically be decimated such that the image resolution is reduced and, therefore, the amount of display area required to present the image is reduced. A picture-in-picture display comprises an inset image within a larger image. Thus, the advertisement information associated with the content stream may be displayed in an inset or auxiliary image within the frozen content imagery. An overlay display comprises the display of

advertisement or other information within the same display area as the frozen content information. Such an overlay display may comprise still or moving imagery providing the appropriated advertisement information. After the advertisement information is integrated into the presented image, the method
5 500 proceeds to step 512 where it waits for a user command.

Upon receiving a user command, the method 500 proceeds to step 514 where a query is made as to whether an advertisement object has been selected. If the query is answered negatively, then the method 500 proceeds to step 516 where a query is made as to whether a local control function has been
10 selected (e.g., audio control, picture control and the like). If a local control function has been selected, then the local control function is performed (step 524) and the method 500 proceeds to step 512 to wait for the next user command. If a local control function has not been selected, then the non-local command is propagated to the head end by the back channel BC for further
15 processing (step 518). The method 500 then proceeds to step 520, where a query is made as to whether a new content stream or other stream is to be presented. If a new content stream or other stream is not to be presented, then the method 500 proceeds to step 512 to wait for the next user command. Otherwise, the method 500 exits at step 525. That is, in the case of the
20 selection by the user of a new stream to be presented, the method proceeds to step 502 where the new stream is presented upon receipt by the set-top box.

If the query at step 514 indicates that an object has been selected, then the method 500 proceeds to step 526, where the selected object is identified. The method then proceeds to step 528, where a query is made as to whether
25 the selected object comprises a web link. That is, at step 528, a query is made as to whether the selected object comprises an object associated with an HTML link or other network address indicative of the desire of a user to open an interactive web or internet session. If the query at step 528 is answered affirmatively, then the method 500 proceeds to step 530 where the selected web
30 link is propagated to the head end and a web session is opened with the head end. The web session may comprise standard interaction between a user and a remote computer displaying goods and/or services associated with the selected

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FIG. 6 depicts a flow diagram of a provider side method according to the invention. The method 600 of FIG. 6 assumes that a session between the subscriber and the head end has been initiated.

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method 600 then proceeds to step 606 to wait for a content stream interruption command from the user. If the query at step 612 is answered negatively, then the method 600 proceeds to step 616.

At step 616, a query is made as to whether an advertisement stream request has been received from the user. That is, at step 616 a query is made as to whether the user has selected an advertisement object associated with the content stream providing advertisement information. If the query at step 616 is answered affirmatively, then the method 600 proceeds to step 620. If the query at step 616 is answered negatively, then the method 600 proceeds to step 622.

At step 620, the requested advertisement stream and any object associated with that advertisement stream are provided to the subscriber. After the advertisement stream is entirely presented to the subscriber, or the subscriber terminates the presentation of the advertisement stream, the method 600 proceeds to step 632.

At step 632, the provider equipment resumes providing the initially requested content stream where it was previously exited. That is, the initially provided content stream was exited at a point due to, for example, the need to provide an advertisement stream to the user at step 620. Upon concluding the presentation of an advertisement stream, the provider resumes providing the initially requested content stream at that exit point. The method 600 then proceeds to step 606, where it waits for a content interruption command from the user.

At step 622, a query is made as to whether the received user command comprises a world wide web (www) link or other command indicative of a desire to open a web session. If the query at step 622 is answered negatively (i.e., some other command has been received), then the method 600 proceeds to step 624 where the user command is processed in the normal manner associated with the received user command (e.g., a billing inquiry, scheduling request and the like). The method 600 then proceeds to step 632. If the query at step 622 is answered affirmatively, then the method 600 proceeds to step 626.

